

**Amendments to the Specification:**

Please amend paragraphs [0025], [0026], [0068]-[0070], [0077], [0078], [0082], [0083], [0086], and [0088] as set forth below.

[0025] ~~Fig. 3~~ Fig. 3a shows an example of locations on a substrate where tilt is determined;

[0026] ~~Fig. 3a~~ Fig. 3b shows the edge contour of a substrate in greater detail;

[0068] In figure 3a ~~figure 3~~, the target area is indicated with reference numeral 13. In this specific case the level sensor 2, 15 has 8 spots which are measured on a substrate 11 in order to determine the local height and tilt of an illuminated part of the target area 13 and to achieve sufficient averaging over the illuminated part of the target area 13. It should be understood that level sensors with an other number of spots may be applied instead.

[0069] Further shown in figure 3a ~~figure 3~~ is a slit shaped area, that is briefly referred to as slit 39. The slit 39 is the area illuminated during imaging in successive target areas 13 during scanning. In the scanning process, the slit 39 moves over the substrate surface in the y direction several times in series next to one another until the entire substrate surface is covered by images of the reticle, as is known to a person skilled in the art. The slit 39 is shaped as a rectangle. According to figure 3a ~~Fig. 3~~, the length dimension of the slit 39 in the x direction is substantially equal to the length in the x direction of a target area 13. It will however be understood by a person skilled in the art that the length dimension of slit 39 may also be smaller or bigger with respect to the length in the x direction of a target area 13. The width (along the y direction) of the slit 39 is much smaller than its length.

[0070] Figure 3a ~~figure 3~~ also shows level scan areas 21 used in the prior art by the level sensor 2, 15 to derive height and tilt data at the edge of the substrate 11. A level sensor spot area 27 is schematically indicated with reference number ~~27~~. The level sensor spot area 27 is scanned over

the substrate surface along a predetermined path in the exposure direction y as indicated with an arrow.

[0077] Using reference fields is explained with reference to figure 3b ~~figure 3a~~. In figure 3b ~~figure 3a~~, the edge contour 17 is shown in greater detail. Figure 3b ~~figure 3a~~ shows a plurality of edge fields 41 located at the edge of the substrate 11, and reference fields 42 located adjacent to the edge fields 41. Substrates can have a roll-off towards the edge contour 17. As a result of such substrate curvature, the tilt on an edge field 41 can be very different from the tilt of the reference field 42. Conventionally, the tilt as measured for reference field 42 may also be used for edge field 41. However, due this potential difference in actual tilt this may result in defocus on edge field 41.

[0078] Using a reference area on the same exposure field is explained with reference to figure 3c ~~figure 3b~~. Figure 3c ~~figure 3b~~ shows an edge field 43 adjacent to the edge contour 17. The lower part of the field, indicated with 43a, indicated with diagonal shading, can successfully and completely be measured with the level sensor 2, 15. For this lower part 43a, all the sensing spots of the level sensor 2, 15 are projected within the edge contour 17. However, in the upper part of the field, indicated with 43b, not all the sensing spots of the level sensor 2, 15 will be within the edge contour. In this tilt information from the lower part 43a is used to obtain an estimate for the tilt in the upper part 43b, instead of using tilt information from a neighboring, reference field 42.

[0082] Now returning to figure 3b ~~figure 3a~~, to reduce the tilt error, it is desirable to reduce the extrapolation distance (the distance between the edge field 41 and the area where the tilt is measured). Currently, as shown in figure 3a ~~figure 3~~, this can be done by performing an additional scan 21<sub>(center)</sub> that can be used as reference area, as illustrated in figure 3a ~~figure 3~~. Since no exposure is done during such a measurement scan this scan can be shifted with respect to the original reference field 42. To reduce the extrapolation distance, this scan is shifted to a location as close to the edge contour as possible, while ensuring that the spots required to

measure tilt are valid, so that it is still possible to measure the tilt during the entire scan. By performing such a measurement scan the defocus can be reduced.

[0083] The measurement scans described above are performed in the normal scan direction: (y direction). Measurement scans that are located close to the central line on the substrate ( $y=0$ ), like level scan area  $21_{(center)}$  in figure 3a ~~figure 3~~, are performed more or less parallel to the substrate edge. As a result, the distance to the edge is sufficiently constant during the entire scan. For level measurement scans above or below the central line of the substrate, like in level scan area  $21_{(top)}$  and level scan area  $21_{(bottom)}$ , only at one end of the scan the spots of the level sensor 2, 15 touch the edge exclusion zone 19. Because of that, the distance of the level scan areas  $21_{(top)}$  and  $21_{(bottom)}$  to the edge of the substrate 11 at the beginning of the scan may be very different compared to the end of the scan in these areas. As becomes apparent from figure 3a ~~figure 3~~, the shaded parts 23 of the substrate 1 are not taken into account for the tilt determination. The average extrapolation distance may therefore not be optimal and this area may not be optimally levelled leveled.

[0086] As a result, the centre of the scan is now located closer to the edge and also closer to the edge exclusion zone 19 where the tilt measurement is used. Therefore, the extrapolation distance is smaller and the tilt applied at the edge field 41 is more accurate than in the prior art arrangement of figure 3a ~~figure 3~~ (note: the edge fields 41 and reference fields 42 from figure 3b ~~figure 3a~~ have not been repeated in figure 4 but are present there as well).

[0088] These shifted measurement scans may be used for (parts of) target portions according to Figs. 3b and 3c ~~Fig. 3a and 3b~~, but the information obtained by such a shifted level sensor spot measurement may also be used for areas on the substrate in which the tilt can already be determined by using the non-shifted level sensor spot measurements. In cases where a number of sensor spots fall within the FEC, a more accurate tilt may be determined using data obtained from a shifted measurement, depending on the specific circumstances. This is because with the shifted measurement the spots used to determine tilt are shifted as close as possible to the FEC,

Serial No.: 10/797,570  
Art Unit: 2851

Attorney's Docket No.: 081468-0308684  
Page 5

while in the non-shifted measurement a considerable distance can exist between the FEC and the outer most spot that can be used.

Please add the following new paragraph after paragraph [0026]:

[0026.1] Fig 3c shows details of one edge field next to an edge contour;